



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

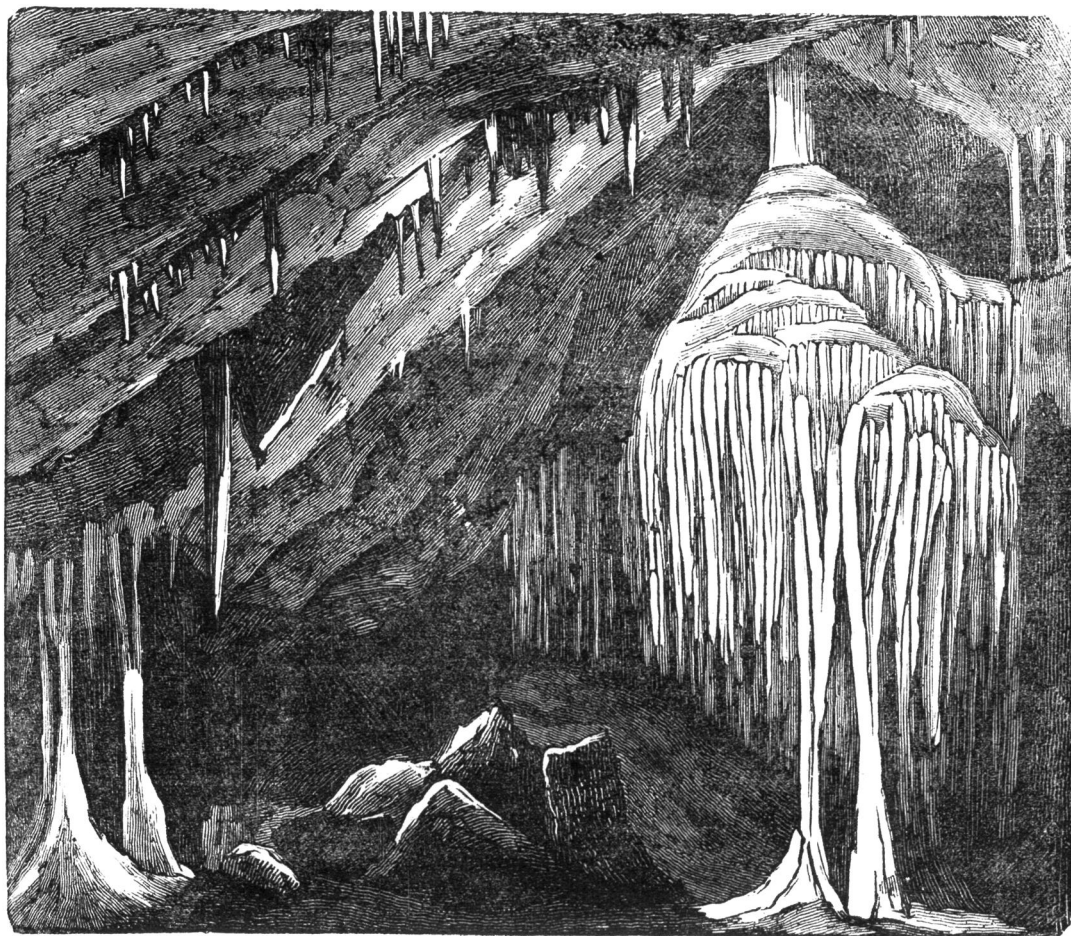
We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

the former of which occurs fifteen feet south of the organ; the latter at the eastern end of the chamber. The base of the former is not simple, but composed of stalks cemented together, and having leaved or foliated edges; some of these edges are of great extent and thinness, and when struck gently, vibrate so as to produce an agreeable sound. The pyramid, a pillar fourteen feet in height, rests upon a base of great dimensions, and its shaft is distinguished by the circumstance of its tapering upwards towards the ceiling. The other pillars are of inferior size, but some of them possess a symmetry and beauty superior to those just described. In addition to

the pillars, stalactites and stalagmites every where abound; the former depending from the roof, the latter springing from the floor of the cavern. They are of every length, from an inch to three or four feet; and they, or rather the greater number of them, together with the pillars, usually correspond in position to the vertical joints of the limestone beds composing the roof of the chamber. Before leaving this part of the cavern, I should not omit to mention, that S. S. W. from the *Pyramid*, and at the distance of twenty feet, there is a rectangular sparry production, raised some feet above the floor, to which, from its shape, the name of *Table* has been applied.



Néaol, del.

Clayton, sc.

THE FOUR COURTS.

From the upper middle cave there are two exits beside that already mentioned, one of which takes an easterly, the other a southerly direction. The former, which augments gradually from four to fifteen feet in breadth, terminates at the distance of 110 feet, in a cul de sac; but about twenty feet from this extremity, there is sent off, in a northern direction, an arm which conducts to the cellar cave, and what is called the *River*. When visited by us, this *river*, which is very difficult of access, appeared to be but a stagnant pool; (or, if the water is ever in motion, such phenomenon was not at the time to be observed;) in the winter season, however, there can be little doubt, as shall be hereafter shown, that this, as well as several other parts of the cavern, is subjected to the action of running water.

The southern exit conducts, by a steep and rugged passage, about fifty feet in length, first ascending, then descending, to what is called the *long cave*—a designation calculated to convey erroneous notions respecting the nature of this part of the cavern. In point of fact, it consists of several galleries, two of which pursue an E. N. E. and W. S. W. direction, and are intersected by several others at an angle of about 105°, or as nearly as possible that of

the primitive crystal of carbonate of lime. The east and west galleries average a width of about fourteen feet, and have, the one a length of 190, the other of about 350 feet. Of the cross galleries, which are all exactly parallel to each other, and have a direction N. N. W. and S. S. E.; the largest is that which faces the entrance from the upper middle cave, and may be considered a prolongation of it; its breadth is fourteen, and its length about 140 feet. The second possesses the same length, but its continuity is interrupted, the entire of the intervals between the lanes it intersects not being traversed by it. It extends somewhat further south, and sends off to the west two branches of about thirty-eight feet in length. Two other galleries, having the same direction with these, are so small, that by the careless observer they may be considered as fissures, and they are so marked upon the map. Throughout the entire of these passages, the fine red clay already described as occurring in the lower middle cave, is very abundant, and in many places is sheeted over with thin spar. Calcareous concretions of other kinds also occur, but not in such quantity, or of such beauty, as in the upper middle cave. From this statement, however, I should except the eastern extremity of the largest

of them, where several specimens of singular beauty are found, and where, upon the sides of the gallery, the spar exhibits the graceful and brilliant undulations of the richest drawing-room hangings. The dimensions assigned to these galleries must not be received as representing their actual extent: to none of them did we find an absolute termination; and the accompanying chart merely gives the limits at which, in consequence of the difficulties opposed to our progress, further investigation was abandoned.

We shall now, returning to the lower middle cave, examine the outlets of its N. E. extremity. From this quarter of it a branch is sent off to the south, 40 feet in length and 6 in breadth, from the centre point of which there is an offset of about the same dimensions, which takes a N. E. direction, and is crossed at the termination by another gallery parallel to the first, and which has probably, as shall be hereafter shown, a subterranean connexion with that prolongation of the upper middle cave in which the river is found. The cross passage just described is encrusted on both sides with sparry productions: fewer in number, however, and of inferior beauty to those which occur in the galleries it connects.

The second outlet of the upper end of the lower middle cave, expands in a N. N. W. direction, into a cavity of an elliptical shape, 90 feet in length and 45 in breadth, its S. S. E. half being divided into two by a wall of limestone 45 feet in length, and about fifteen in breadth. On the western side of this wall, and between it and the side of the cave, occur four or five magnificent pillars, and at the south angle a small cavity, composed entirely of spar, which was described to us under the name of the *bed-chamber*; it is entered on the north side, through a narrow hole; and from it, but through a smaller and more difficult passage, it is possible to return into the lower middle cave. The portion of the bed-chamber cave to the east side of the stony partition, exhibits nothing remarkable until we reach its N. E. extremity: here, three magnificent stalagmites are encountered, and a pillar of unusual magnitude extending from the floor to the ceiling, and which has received from the guides the name of Lot's wife. This huge stalactitic production occurs at the commencement of an avenue twenty feet long, and about ten wide, at the termination of which three distinct adits present themselves. One of these faces directly the avenue just described, and leads to the Garrett cave; the other two, which are on the left hand, and distant from each other about seven feet, constitute the respective entrances to the grand Kingston gallery and Sand cave.

The Garrett cave extends 255 feet in an easterly direction, with a sweep to the south; its breadth at the commencement being 15, and augmenting gradually until, at its widest part, it becomes 55 feet. The floor, which is every where covered with blocks of limestone scattered in the greatest disorder, is not horizontal, but ascends by a considerable angle, so as, at its remote extremity, to come within a few feet of the ceiling: there is no department of the entire cavern in which pillars, stalactites, and stalagmites of spar are more numerous or more beautiful. The more remote or upper portion, also, of this chamber, is distinguished by the enormous number of small stalactites of from six inches to a foot in length, depending from the ceiling, and studding it at almost every point. The ceiling also, in one part of the cave, would appear to have recently fallen, the floor being covered with a confused pile of fragmented rocks, and the corresponding portion of the roof being destitute of stalactitic productions.

Upon returning to the entrance of the Garrett cave, and ascending by a steep and rugged passage into the most westerly of the two adits already mentioned, we find ourselves within the grand Kingston gallery—the most remarkable compartment of the entire excavation. It is a perfectly straight hall, 175 feet in length and 7 in breadth, with a direction about one point to the west of north. The arching of this gallery is in the Gothic style, and its walls are every where glazed with spar, in some places red, in others mottled, but no where of a perfectly white colour. This gallery, at the distance of 126 feet from its entrance, was originally blocked up by a thin

diaphragm or sheet of spar, but it is now perfectly continuous throughout, a passage having been some time ago broken in the partition, through which one individual at a time can pass. Immediately beyond this partition, a large pillar is met with in the centre of the gallery—about 15 feet further on, another of the same magnitude—and some distance beyond this, and in a line, four others of inferior size. The grand gallery terminates in a rectangular cave, 52 feet wide and 30 long, from the north of which there is a passage in the same line with the grand gallery, and which admitted of being explored to the extent of 87 feet.

From the rectangular cave just described, and which is situate about twelve feet lower than the floor of the Kingston gallery, there is a passage leading back to the entrance of the Garrett cave. This passage, which is called the Sand cave, from the quantity of this material which covers its floor, is, for two-thirds of its length 12 and for the remainder three feet wide: it is perfectly parallel to, and of the same length with the Kingston gallery, but placed at a somewhat lower level.

On the east side of the rectangular cave in which the Sand cave and gallery terminates, there are two long and narrow entrances, which pass directly E. N. E., the northern one bending at the distance of about thirteen feet to the south, so as to meet the other. From this point they constitute a single passage, which proceeds directly south, and then, bending westward, opens into the Sand cave at about forty feet from its northern point of commencement. This winding channel expands and contracts in its progress, so as to form a string of small cells called closets, amounting, as we were informed, to about twenty in number: these closets, however, though laid down in the map, we did not personally examine. In the Sand cave there are no sparry formations; and, indeed, nothing of any interest which has not been mentioned, save a collection of water in a calcareous basin, within a few feet of its southern termination.

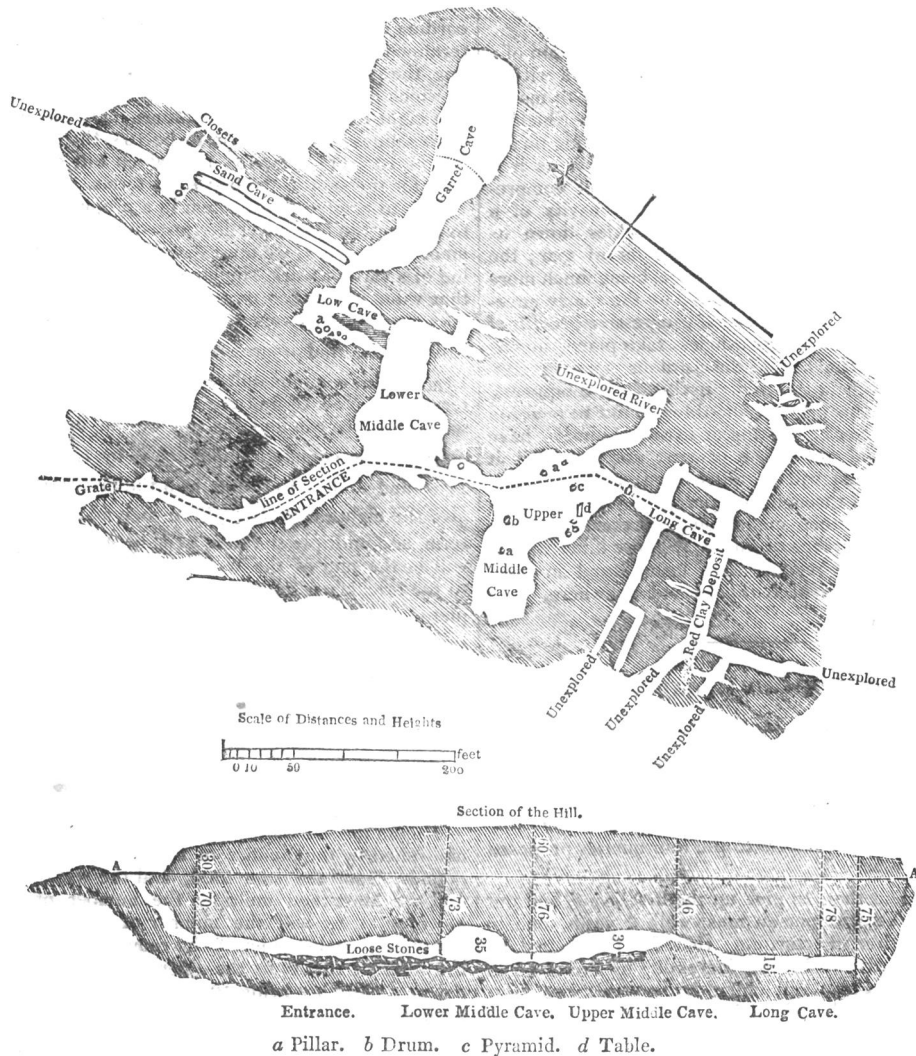
From the preceding brief description, the newly discovered cavern, it will be seen, is not a single excavation, but is composed of a number of chambers, some of greater, some of less magnitude, connected by rugged and narrow passages, the floor of these being generally covered with prismatic blocks of limestone, and the sides and ceiling loaded with calcareous incrustations. Pillars also of the same material as has been already described, often connect the floor and ceiling; and the masses of limestone on the floor, are, in many places, covered with spar, giving rise to stalagmatic productions of the most varied and fantastic appearance. The length of the entire cavern, from the entrance to the extremity of the long cave, which corresponds with the line of section given in the map, is seven hundred feet; but a line passing through the grand gallery, and extending to the northern and southern limits of the entire series of cavities, would measure 870 feet. Another line, drawn from the entrance to the farthest extremity of the Garrett cave, has an east and west direction measuring 572 feet, which may be considered as giving the greatest breadth of the cavern, or as comprehending its eastern and western boundaries. The floors of the different chambers, included in the annexed section, namely, of the lower middle, upper middle, and long caves, are very nearly horizontal, and depressed about 55 feet below the grate through which the cavern is entered. The depression of the Kingston gallery below this point is but 47 feet, and that of the eastern end of the Garrett cave but 19. This latter chamber is, therefore, that which comes closest to the surface, and the thickness of the intervening strata is, it may be observed, diminished not only by its actually greater elevation, but also by the circumstance of this portion of the cavern corresponding, not to the apex, but to the north-eastern slope of the hill.

In glancing at the accompanying ground plan, several portions of the cavern are observed to be parallel, all running S. S. E. and N. N. W. Three of these are in a line, namely, the Sand cave to the north, and offsets from the lower and upper middle caves to the south: between these different passages there can be no doubt that there is a subterraneous communication, and that, at certain

seasons of the year, they are traversed by running water. It is worthy of remark, that at the time of our visit, water was found at two points on this line, namely, at the junction of the Sand and Garrett caves, and at the prolongation of the upper middle cave, where the river has

been already described as occurring. It may be also not uninteresting to mention, that the line of direction just specified, corresponds with that of the dip of the limestone beds which compose the hill.

MAP OF MITCHELSTOWN CAVES.



The figures on the Map express the depth in feet below the line of section A.A.

ON THE FORMATION OF SPARRY PRODUCTIONS.

The manner of formation of sparry productions in limestone caves is so generally known, that it is scarcely necessary to advert to the subject here. Water filters through the roof, containing carbonate of lime held in solution by carbonic acid, and this gas, gradually passing with some water into the atmosphere, the calcareous salt is deposited. The atmosphere within the cavern was, as might have been anticipated, found saturated, or nearly so, with moisture: for though its temperature was not lower than 50°, the pulmonary halitus condensed into a visible cloud, and the body, under slight exertion, became bathed with perspiration; but it did not, it is fair to conclude, contain any unusual percentage of carbonic acid, for it supported, in the ordinary manner, both respiration and combustion. What then becomes of the carbonic acid, the development of which is the immediate cause of the deposition of spar? Why does it not accumulate so as finally to create an irrespirable atmosphere? These are interesting but difficult questions, and the following is put forward only as a conjectural solution of the difficulty. These caves are usually traversed by running water, and as this, at common temperatures, combines with

one volume of carbonic acid, the gas may be considered as in a continual process of absorption and removal. It is a peculiarity, also, of æiform fluids, as Dalton has shown, that however different in density, they will, when placed in contact, blend together so as finally to constitute an equable mixture. Now, as the roofs of limestone caverns are seldom, if ever, so tight at every point as to be altogether impermeable to gases, we perceive in the law which regulates their diffusion, additional means for effecting the elimination of the carbonic acid.

There is a circumstance connected with the structure of stalactitic spars, which must have been frequently noticed, though it would not appear to have attracted much attention, for I do not recollect having seen any allusion to it in books—all the smaller stalactites are hollow along the axis, but those of a larger size are solid throughout. This fact, however, it is not difficult to explain. If a drop of a solution of supercarbonate of lime be conceived depending from some prominence in the roof of a cave, the evaporation necessarily takes place from its external surface; and in virtue of this, it will be shortly invested with a film of spar which will, in a great measure, protect its interior from a continuance of the process. The afflux of additional calcareous solution, will augment the thickness of